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A.D. 1873, 19th JULY. N° 2483.  
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Separating Matters of Different Specific Gravities.

LETTERS PATENT to Samuel Henry Fortnom Cox, of Cornwall House, Penzance, in the County of Cornwall, Civil Engineer, for the Invention of "IMPROVED APPARATUS FOR SEPARATING FROM EACH OTHER MATTERS OF DIFFERENT DENSITIES OR SPECIFIC GRAVITIES."

Sealed the 16th January 1874, and dated the 19th July 1873.

PROVISIONAL SPECIFICATION left by the said Samuel Henry Fortnom Cox at the Office of the Commissioners of Patents, with his Petition, on the 19th July 1873.

I, SAMUEL HENRY FORTNOM COX, of Cornwall House, Penzance, in the County of Cornwall, Civil Engineer, do hereby declare the nature of the said Invention for "IMPROVED APPARATUS FOR SEPARATING FROM EACH OTHER MATTERS OF DIFFERENT DENSITIES OR SPECIFIC GRAVITIES," to be as follows:—

The object of this Invention is the construction of an efficient and simple apparatus for effecting the separation from each other of matters which have different densities or specific gravities.

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The said Invention will be found very advantageous for the separation of tin, copper, or lead ores, as they come from the stamps, and for other like purposes.

The said apparatus is constructed as follows:—It has a conduit or tube, whereby it is supplied with water from any convenient source. 5 Above this conduit I place a case or vessel, or a number of cases or vessels, in each of which is enclosed a perforated tube or other vessel, which forms the separator. Between the separator and the conduit I place a cock or valve for regulating the supply of water to the case; the top of each case is provided with a hopper or reservoir, which is 10 supplied with the stamped tin ores, or other materials or matters to be separated through a suitable trough or channel.

The said apparatus will commonly require a series of hopper cases and check valves, arranged side by side, and the said cases or hoppers will be connected with each other by troughs or channels. 15

The water for separating the materials or matters in the said apparatus is supplied to the cases at the bottom through the aforesaid conduit, and by means of the valves or cocks its admission is regulated as required, according to the nature of the said materials or matters. The heavy or dense portions thereof will sink to the bottom and pass 20 off to any suitable receptacle, or another complete separator, as may be required, connected with the said apparatus; while the lighter or less dense portions pass away at the top of the case to the next case, or directly to another receptacle arranged to receive them.

The form and arrangement of the said cases and other parts of the 25 said apparatus may be varied to adapt it in the most advantageous manner to the peculiar nature of any materials or matters desired to be separated by the said apparatus.

SPECIFICATION in pursuance of the conditions of the Letters Patent, filed by the said Samuel Henry Fortnom Cox in the Great Seal 30 Patent Office on the 17th January 1874.

TO ALL TO WHOM THESE PRESENTS SHALL COME, I, SAMUEL HENRY FORTNOM Cox, of Cornwall House, Penzance, in the County of Cornwall, Civil Engineer, send greeting.

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WHEREAS Her most Excellent Majesty Queen Victoria, by Her Letters Patent, bearing date the Nineteenth day of July, in the year of our Lord One thousand eight hundred and seventy-three, in the thirty-seventh year of Her reign, did, for Herself, Her heirs and
5 successors, give and grant unto me, the said Samuel Henry Fortnom Cox, Her special licence that I, the said Samuel Henry Fortnom Cox, my executors, administrators, and assigns, or such others as I, the said Samuel Henry Fortnom Cox, my executors, administrators, and assigns, should at any time agree with, and no others, from time to time and
10 at all times thereafter during the term therein expressed, should and lawfully might make, use, exercise, and vend, within the United Kingdom of Great Britain and Ireland, the Channel Islands, and Isle of Man, an Invention for "IMPROVED APPARATUS FOR SEPARATING FROM EACH OTHER MATTERS OF DIFFERENT DENSITIES OR SPECIFIC GRAVITIES," upon
15 the condition (amongst others) that I, the said Samuel Henry Fortnom Cox, my executors or administrators, by an instrument in writing under my, or their, or one of their hands and seals, should particularly describe and ascertain the nature of the said Invention, and in what manner the same was to be performed, and cause the same to be filed in the Great
20 Seal Patent Office within six calender months next and immediately after the date of the said Letters Patent.

NOW KNOW YE, that I, the said Samuel Henry Fortnom Cox, do hereby declare the nature of my said Invention, and in what manner the same is to be performed, to be particularly described and ascertained
25 in and by the following statement, reference being had to the accompanying Drawing forming a part of this Specification:—

The object of this Invention is the construction of an efficient and simple apparatus for effecting the separation from each other of matters which have different densities or specific gravities.

30 The said Invention will be found very advantageous for the separation of tin, copper, or lead ores, as they come from the stamps, and for other like purposes.

The Drawing represents my improved apparatus as constructed especially for dressing tin.

35 Figure 1 is a vertical section of the said apparatus; Figure 2 is a similar section, taken at a right angle to Figure 1; Figure 3 is a plan

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or top view of a portion of the said apparatus; Figure 4 is a transverse section on the line x, x , Figure 1; Figure 5 is a transverse section on the line y, y , Figure 1. Like letters indicate the same parts throughout the Drawing.

The said apparatus is constructed as follows:—It has a conduit or 5 tube whereby it is supplied with water from any convenient source. Above this conduit I place a case or vessel a , in which is enclosed a perforated tube or vessel b , which forms the washer. Between this washer b and the conduit I place a cock or valve c for regulating the supply of water to the case a . The top of the case a is provided with 10 a hopper or reservoir d ; e is a taper plug or cone, which is attached to the end of the screw f , or is provided with other means of adjustment. This plug is hollow, and in some cases open at the bottom, and I prefer that it should have a row of holes e^1 around its upper edge in such a position that they are always in or near an annular space at g , 15 between the cone e and the interior of the vessel in which the same is enclosed; but if desired the said plug may be made without these holes, or the said plug may be made hollow, closed at the bottom, and supplied with water from above instead of below, so that the holes e^1 may be supplied with water from the same source as the washer, or 20 from a different source. This part of the apparatus forms the separator, but I do not restrict myself to any particular form of orifice, or particular form of plug.

The stamped or other material to be treated may be carried from the stamps or other source of supply in launders or other suitable channels, 25 into the hopper or reservoir d , or other receptacle enclosing the cone e . Water is admitted at the bottom of the apparatus and the supply is regulated by the cock or valve through which the water passes. When the hopper d is filled by water from below the stamped ore or other material to be dressed or treated with its water is admitted into the 30 hopper or reservoir from above, and the tin or other ore or material to be dressed at once sinks toward the bottom of the hopper. It there meets the water ascending through the aforesaid annular or other space with so great a velocity that only the mineral and heavy waste has such a gravity as will cause it to sink through this ascending 35 column of water. The mineral having passed through the annular or other space into the case a surrounding the perforated tube b is there by the violent agitation of the water again thoroughly washed and

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cleansed from any slime that may be adhering to it, the slime being carried back into the hopper by the ascending current of water. The cleansed mineral and heavy waste then sinks to the bottom of the case and is carried out through the side cock *h* by the flow of water there
5 escaping into a receiver. By means of the hand wheel *f*¹ and screw *f*, or other suitable means, the taper plug *e* at the bottom of the hopper or reservoir *d* can be raised or lowered to increase or diminish the area of the annular opening, and thus regulate the velocity of the ascending column of water; in this manner the said apparatus can be adapted
10 to any class of work, whether coarse or fine.

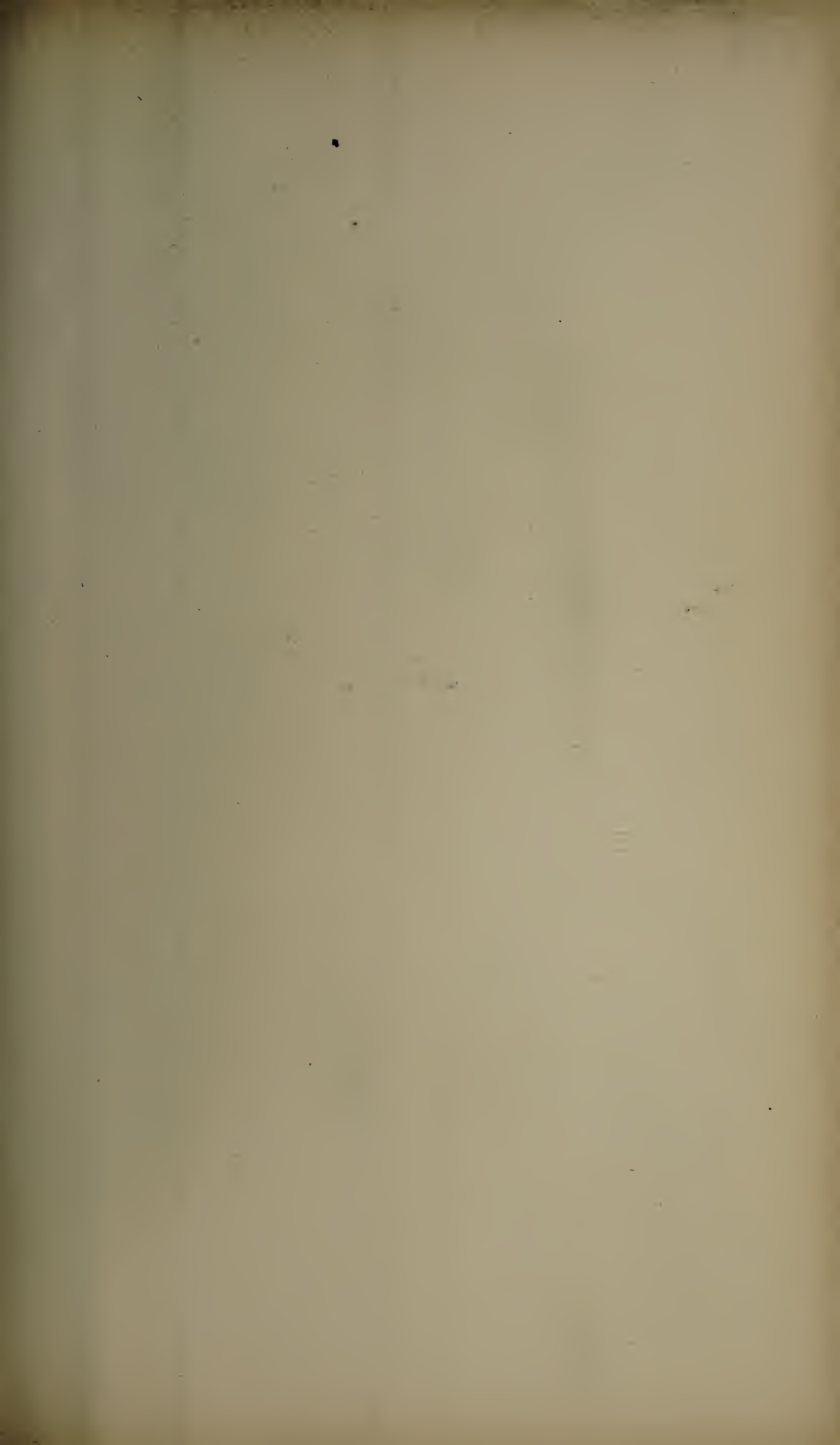
Having thus fully described my said Invention, and the manner of performing the same, I wish it understood that I do not limit myself to the precise details of construction herein described and illustrated in the accompanying Drawing, as these may be varied or modified
15 as may be required to adapt the said apparatus to different kinds of work without departing from the principle of my Invention, and that I claim, the improved apparatus for separating from each other matters of different densities or specific gravities, constructed and operating substantially as herein set forth.

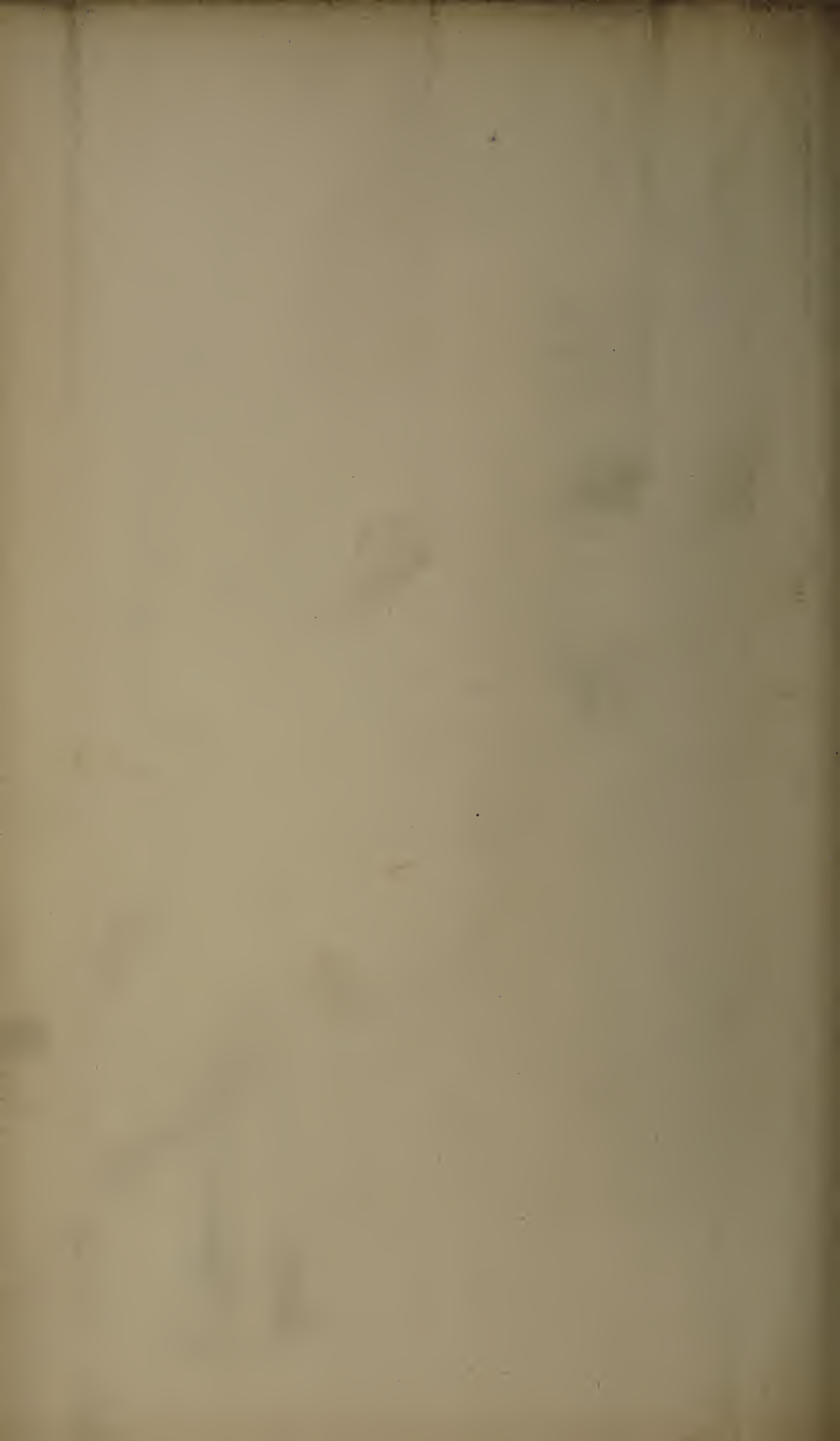
20 In witness whereof, I, the said Samuel Henry Fortnom Cox, have hereunto set my hand and seal, this Fifteenth day of January in the year of our Lord One thousand eight hundred and seventy-four.

S. H. F. COX. (L.S.)

LONDON:

Printed by GEORGE EDWARD EYRE and WILLIAM SPOTTISWOODE,
Printers to the Queen's most Excellent Majesty. 1874.





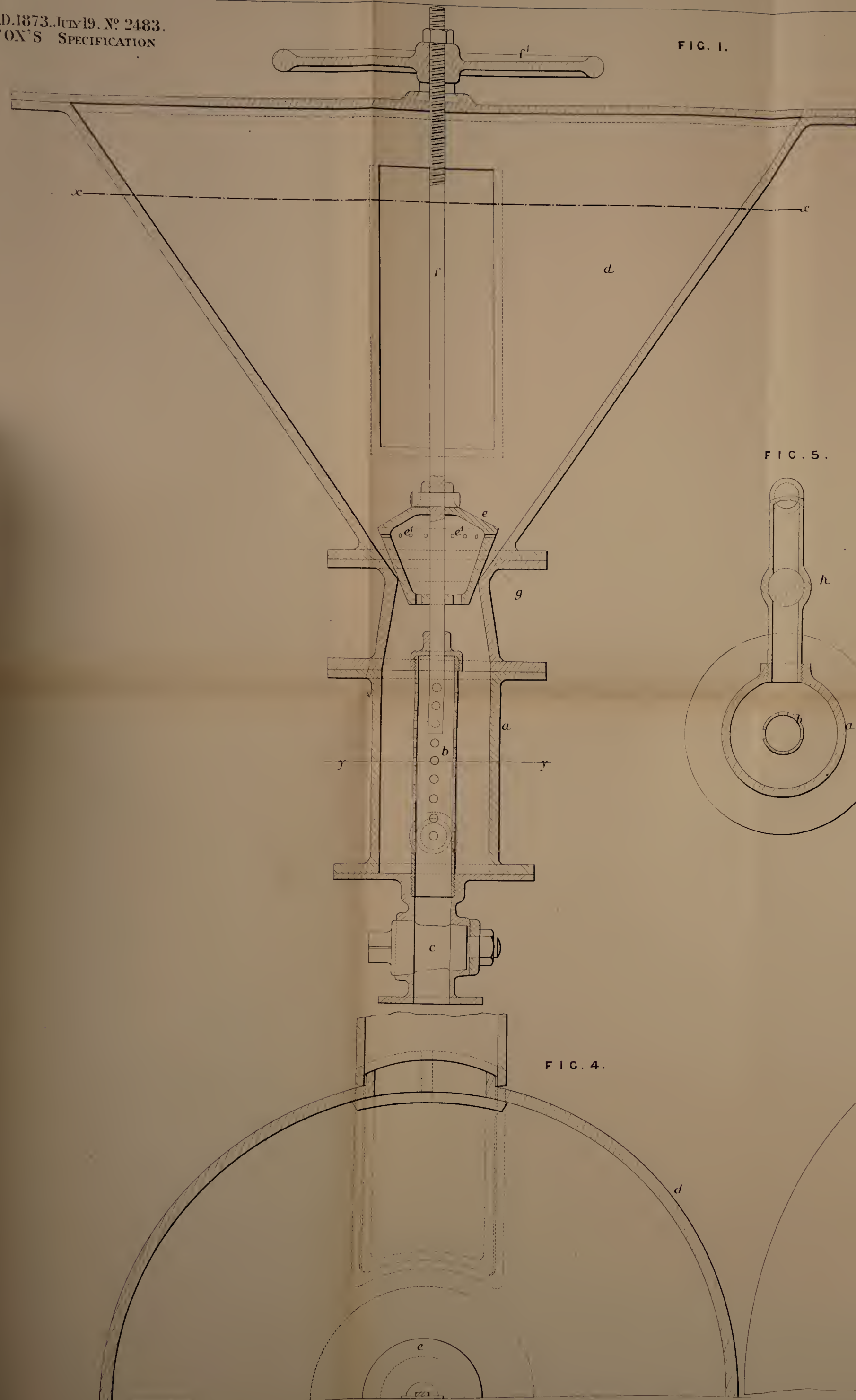


FIG. 1.

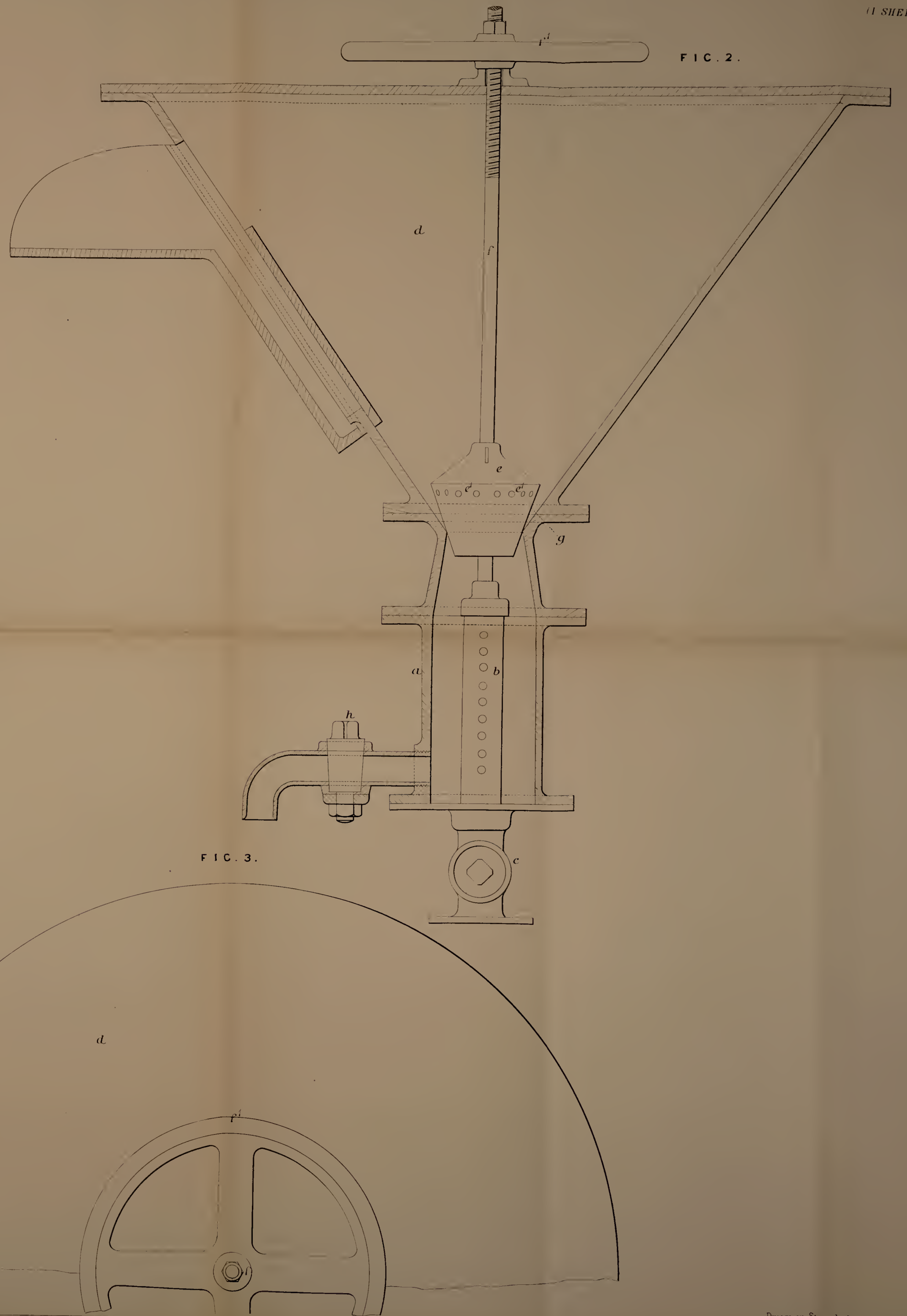


FIG. 2.

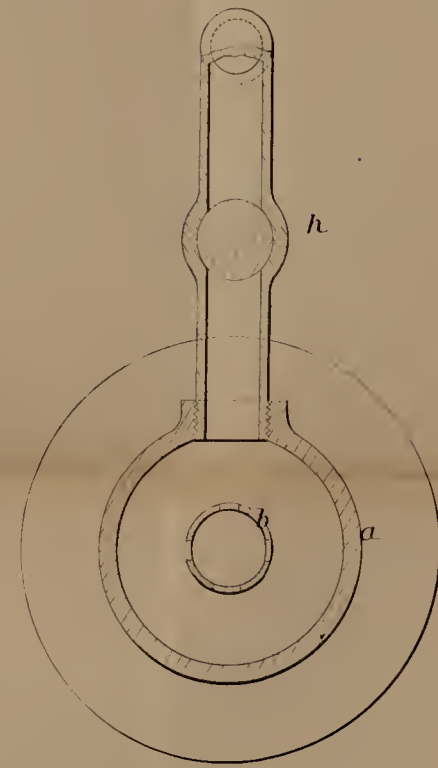


FIG. 5.

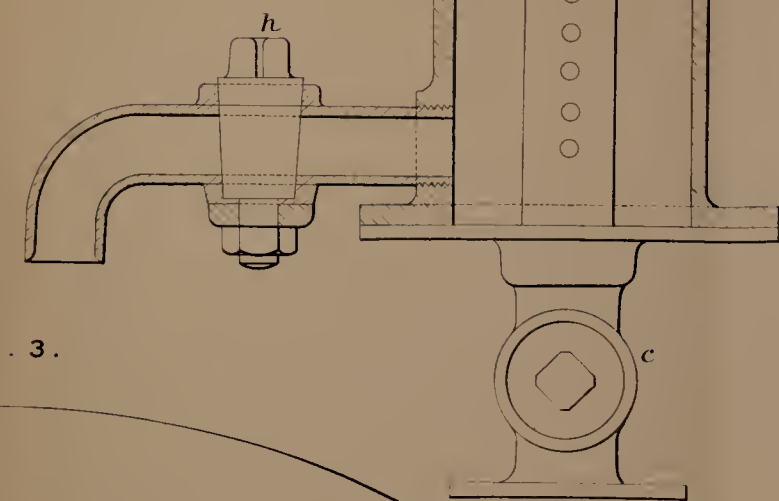


FIG. 3.

FIG. 4.

